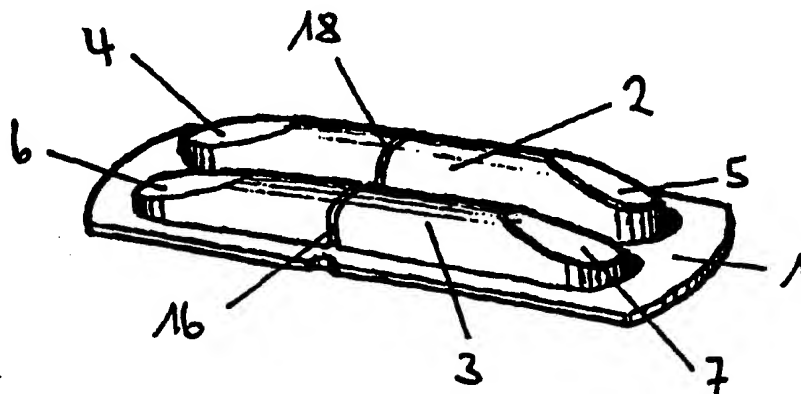




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/EP97/01197 <b>(22) International Filing Date:</b> 10 March 1997 (10.03.97)  <b>(30) Priority Data:</b> 9605548.8      15 March 1996 (15.03.96)      GB  <b>(71) Applicant (for all designated States except US):</b> DR. KARL THOMAE GMBH [DE/DE]; Birkendorfer Strasse 65, D-88397 Biberach (DE).  <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> BECKER, Robert [DE/DE]; Stresemannstrasse 40, D-88400 Biberach (DE). BRAUNS, Ulrich [DE/DE]; Alleenstrasse 54, D-88400 Biberach (DE). TYLDESLEY, William, Frank [GB/GB]; 2 Common Farm Cottage, High Common North, Lopham, Diss, Norfolk IP22 2HS (GB). BAXTER, William, Ronald, Stuart [GB/GB]; 122 Chesterton Road, Cambridge CB4 1BZ (GB).		<b>(81) Designated States:</b> AL, AM, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE (Utility model), DK (Utility model), EE, EE (Utility model), ES (Utility model), FI (Utility model), GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT (Utility model), RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** PACKAGING FOR TWO OR MORE SUBSTANCES TO BE MIXED TOGETHER

**(57) Abstract**

Disclosed is a packaging for two or more substances to be mixed together, the packaging comprising at least a pair of compartments (2, 3), each for retaining a respective one of the substances, and opening means (16, 18) for opening the compartments to allow the substances to be discharged therefrom, wherein the opening means is so arranged as to be operable to open the compartments substantially simultaneously, and that the opening of either one of the compartments (2, 3) by the opening means cannot be achieved without also opening the other compartments.

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**PACKAGING FOR TWO OR MORE SUBSTANCES  
TO BE MIXED TOGETHER**

Field of the Invention

This invention relates to packaging for two or more substances to be mixed together.

Background to the Invention

Many products are supplied in the form of two component systems, in which constituents of the products are provided in separate containers. For example, the packaging for a two component adhesive system comprises separate containers for a bonding agent and a curing agent which is mixed with the bonding agent immediately before use.

One disadvantage of such packaging is that the user can erroneously mix the constituents together in the wrong proportions or even omit to use either one of the constituents altogether. This potential problem applies to all packaging for multi-component systems in which it is important for all the constituents to be mixed together, and in the correct proportions.

Consequently, it is very difficult to provide medication in the form of a two component system which can be supplied directly to a patient for self administration.

Summary of the Invention

According to the invention, there is provided packaging for two or more substances to be mixed together, the packaging comprising at least a pair of compartments, each for retaining a respective one of the substances, and opening means for opening the compartments to allow the substances to be discharged therefrom, wherein the opening means is so arranged as to be operable to open the compartments

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substantially simultaneously, and that the opening of either one of the compartments by the opening means cannot be achieved without also opening the other compartments.

Thus, the invention helps to ensure that the end user dispenses both the substances, or at least makes it difficult for the user to use one substance without also releasing the other. As a result, packaging in accordance with the invention is particularly suitable for medication in the form of a two-part system comprising a pair of compartments.

In an example of such a system, each compartment could contain a respective drug. In another example, one compartment could contain a drug and the other an agent to assist in the dissolving of the drug in water.

Preferably, the opening means is operable to open the compartments at regions on the same side of the packaging so that, with the packaging appropriately orientated, the substances are discharged from the compartments simultaneously.

This further reduces the likelihood of the user failing to mix both substances.

Preferably, the opening means comprises a zone of weakness in the packaging, and the packaging is flexible so that appropriate flexing of the packaging causes the latter to be broken open at said zone of weakness. Preferably, each compartment has a respective zone of weakness.

Preferably, the packaging comprises a plate from which the compartments depend, the plate having at least two apertures through which the substances can be introduced into the compartments thereby to charge the packaging.

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Preferably, with the packaging charged, the apertures on the plate are sealed by one or more pieces of sheet material. In this case, each aperture is preferably sealed by a respective one of two separate pieces of sheet material.

The latter feature prevents the substance in one compartment migrating into the other compartment along any interface between sheet material and plate, and also enables one compartment to be sealed before the other is filled, thereby preventing contamination of the substance in said first filled compartment during the filling of the other compartment.

Preferably, the plate is foldable about an axis, and the zones of weakness on the compartments run parallel to said axis.

Thus, if the packaging contains a drug and an agent to facilitate the dissolving of the drug, a user can release those substances into a beaker of water simply by holding the plate above the beaker with the zone(s) of weakness along the bottom of the packaging, and then folding the plate to open both compartments and thereby discharge the substances into the beaker.

Preferably, the compartments are elongate so that, when the plate is folded to open the compartments, the latter act as chutes for the substances being discharged.

In order to facilitate manipulation of the plate, the compartments optionally are flattened at the end to help locate the user's fingers on the underside of the plate.

In another modification of the invention a handle is located at one end of the plate. The handle preferably is designed as a mould or impression in a way that it can be easily held between thumb and forefinger.

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The invention also lies in packaging as hereinabove described, wherein one compartment of the packaging contains a solid drug to be administered by, and the other compartment contains an agent to facilitate the dissolving of the drug.

#### Brief Description of the Drawings

An example of packaging in accordance with the invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a perspective view of the packaging modification 1;

Figure 2 shows the packaging corresponding to Figure 1 when inverted;

Figure 3 is a view corresponding to Figure 1, and shows the packaging when sealed;

Figure 4 is a view corresponding to Figure 1 of the packaging after breaking along the line of weakness and discharging the content;

Figure 5 is a view corresponding to Figure 7 of the packaging after breaking along the line of weakness and discharging the content;

Figure 6 is a view corresponding to Figure 7, and shows the packaging when inverted and sealed;

Figure 7 is a perspective view of the packaging modification 2;

Figure 8 shows the packaging corresponding to Figure 7 when inverted;

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Detailed Description

The packaging shown in the drawings is intended to be hand-held and used in the administration of a powdered drug which is to be dissolved in a beaker of water (not shown). The packaging is intended to contain both the drug and an agent which needs to be mixed with the drug immediately prior to administration, but which needs to be kept separate from the drug during storage. Such an agent may for example be an agent for facilitating the dissolving of the drug in water.

With reference to Figures 1 and 2 and Figures 7 and 8 the packaging comprises a polystyrene body having a backing plate 1 from which two cylindrical compartments 2 and 3 project.

In modification 1 (Figure 2) of the invention the compartments 2 and 3 are flattened at every end portion (4,5,6,7) in order to facilitate the holding of the device by a user by locating a respective one of the user's fingers on the flattened end portions.

In modification 2 (Figure 7) of the invention a handle 8 is located at one end of backing plate 1. The handle 8 preferably is designed as a mould 9 or impression in a way that it can be easily hold between thumb and forefinger by locating the user's thumb in the mould or impression and locating the forefinger on the underside of the mould or impression.

Each of the compartments 2 and 3 has a respective line of weakness, 16 and 18, which extends laterally across the middle of its compartment. The lines 16 and 18 are aligned with each other.

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The lines of weakness 16 and 18 extending laterally across the compartments 2 and 3 can also be located outside the middle of the compartments, subdividing the longitudinal axis of the compartments 2 and 3 in in a short and one longer part in a ratio between 0.5:6 and 2:6, preferably in a ratio of 1:6. Preferably the short part of the subdivided longitudinal axis is faced to the handle (Figure 7).

The face of the plate 1 opposite the compartments 2 and 3 includes apertures 22 and 24 (Figure 1, 8) through which the compartments 2 and 3 can be filled, one with a drug, the other with the agent to assist dissolving. Once so filled, the compartments 2 and 3 are sealed by means of foil seals 26 and 28 which are heat-sealed onto the plate 1 so as to cover the apertures 22 and 24 (Figure 3 and 6).

When the contents of the chambers 2 and 3 are to be discharged, the user holds the plate 1 in the orientation shown in Figure 1 in both hands, and presses on the centre of the plate 1 with his/her thumbs. This causes the plate to fold about the axis 20 (Figure 4), thereby also breaking open the chambers 2 and 3 along the corresponding zones of weakness 16 and 18 as indicated in Figure 4.

Each of the compartments 2 and 3 is thus broken in two parts, and the two parts of each compartment are inclined so that the contents thereof are discharged under the influence of gravity.

Although a container for a drug and another agent has been described, it will be appreciated that other substances can be contained.



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Applying the modification 2 the user holds the longer part of the plate 1 in one hand. Then the user takes the handle 8 in his other hand in away that he takes the handle between thumb and forefinger by locating the thumb in the mould 9. The user holds the plate 1 in an upright position and bends the handle towards the sealing.

This causes the plate to fold about the axis 20 (Figure 5), thereby also breaking open the chambers 2 and 3 along the corresponding zones of weakness 16 and 18 as indicated in Figure 5.

Then the user discharges the content by turning the opening upside down

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Patent Claims

1. Packaging for two or more substances to be mixed together, the packaging comprising at least a pair of compartments, each for retaining a respective one of the substances, and opening means for opening the compartments to allow the substances to be discharged therefrom, wherein the opening means is so arranged as to be operable to open said compartments substantially simultaneously, and that the opening of either one of the compartments by the opening means cannot be achieved without also opening the other compartments.
2. Packaging according to claim 1 in the form of a two-part system, said packaging comprising a pair of compartments.
3. Packaging according to claim 2, suitable for medication, characterised in that each compartment of said pair of compartments contains a respective drug or one compartment contains a drug and the other an agent to assist in the dissolving of the drug in water.
4. Packaging according to claim 1, characterised in that the opening means is operable to open the compartments at regions on the same side of the packaging so that, with the packaging appropriately orientated, the substances are discharged from the compartments simultaneously.
5. Packaging according to claim 1, characterised in that the opening means comprises a zone of weakness in the packaging, and the packaging is flexible so that appropriate flexing of the packaging causes the latter to be broken open at said zone of weakness.
6. Packaging according to claim 1, characterised in that each compartment has a respective zone of weakness and

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the packaging comprises a plate from which the compartments depend, the plate having at least two apertures through which the substances can be introduced into the compartments thereby to charge the packaging.

7. Packaging according to claim 6, characterised in that, with the packaging charged, the apertures on the plate are sealed by one or more pieces of sheet material.

8. Packaging according to claim 6, characterised in that the plate is foldable about an axis, and the zones of weakness on the compartments run parallel to said axis.

9. Packaging according to claim 6, characterised in that the compartments are elongate so that, when the plate is folded to open the compartments, the latter act as chutes for the substances being discharged.

10. Packaging according to claim 6, characterised in that the compartments are flattened at the end to help locate the user's fingers on the underside of the plate.

11. Packaging according to claim 6, characterised in that a handle is located at one end of the plate.

12. Packaging according to claim 11, characterised in that the handle is designed as a mould or impression in a way that it can be easily hold between thumb and forefinger.

13. Packaging according to claim 2, characterised in that the packaging comprises a polystyrene body having a backing plate 1 from which two cylindrical compartments 2 and 3 with flatted end portions project.

14. Packaging according to claim 13, characterised in that each of the compartments 2 and 3 has a respective line of weakness 16 and 18 extending laterally across the middle of

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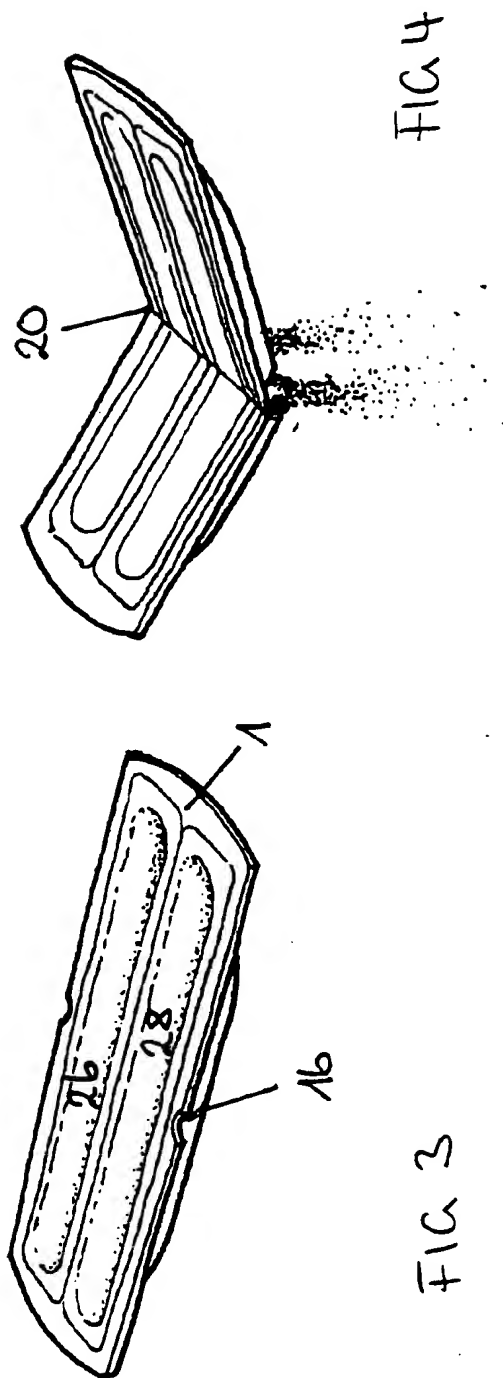
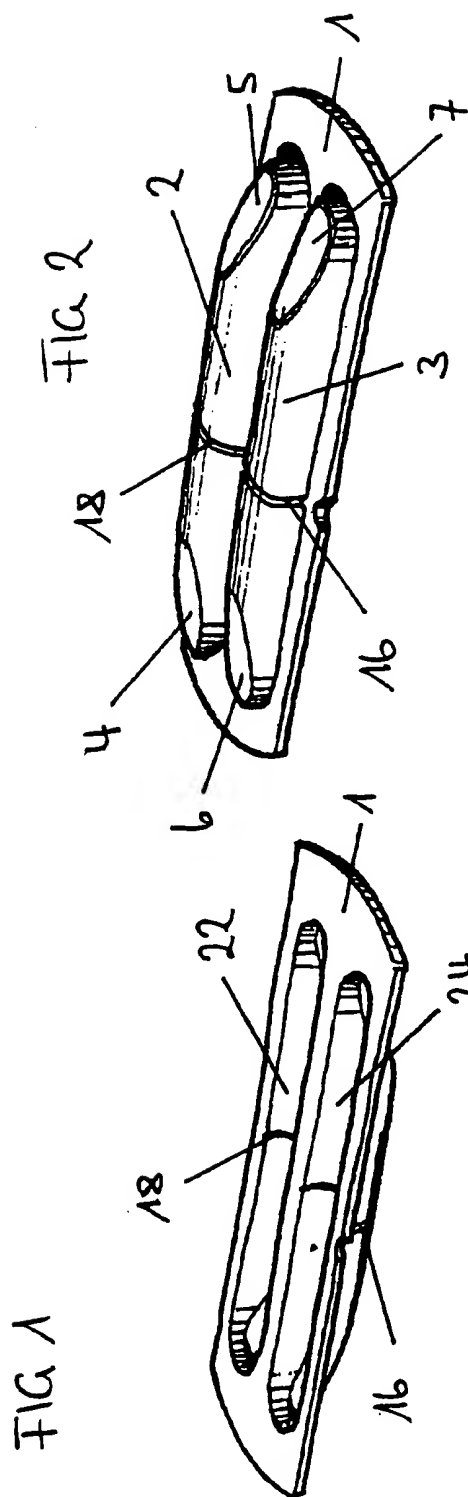
its compartment, and the lines 16 and 18 are aligned with each other.

15. Packaging according to claim 2, characterised in that the packaging comprises a polystyrene body having a backing plate 1 from which two cylindrical compartments 2 and 3 project, said plate 1 comprising a handle 8 located at one end of the backing plate 1.

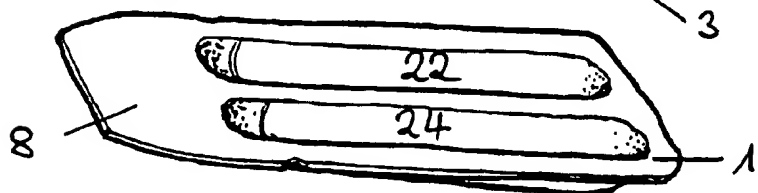
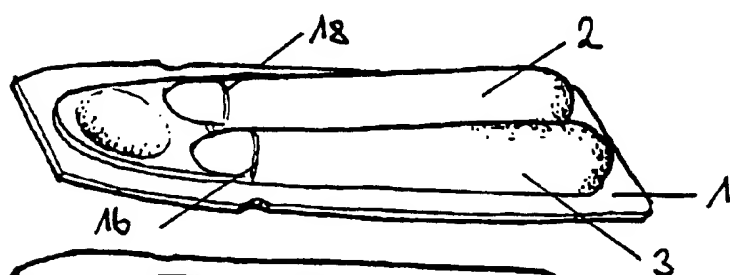
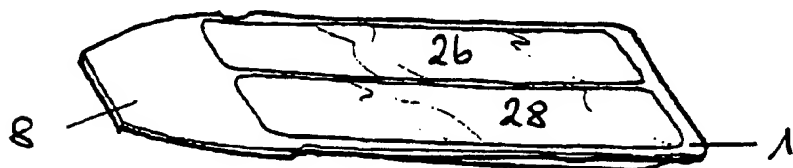
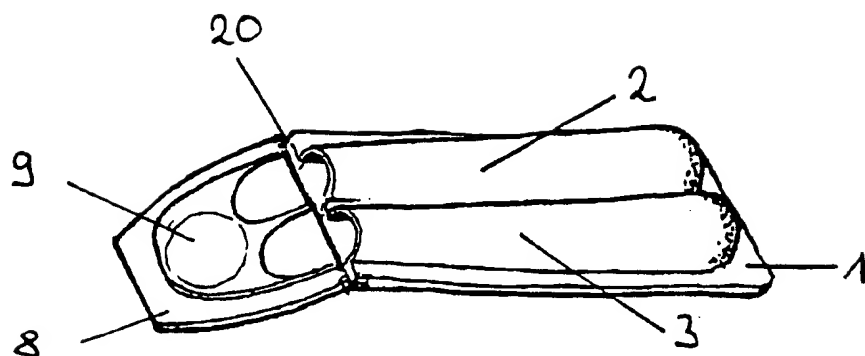
16. Packaging according to claim 15, characterised in that each of the compartments 2 and 3 has a respective line of weakness 16 and 18 extending laterally across its compartment, whereby the lines 16 and 18 are located outside the middle of the compartments 2 and 3 thus subdividing the longitudinal axis of the compartments 2 and 3 in a short and one longer part in a ratio between 0.5:6 and 2:6, and the lines 16 and 18 are aligned with each other.

17. Packaging according to claim 16, characterised in that the short part of the subdivided longitudinal axis is faced to the handle.

18. Packaging according to claims 13 and 15, characterised in that the face of the plate 1 opposite the compartments 2 and 3 includes apertures 22 and 24 through which the compartments 2 and 3 can be filled.



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# INTERNATIONAL SEARCH REPORT

Inter nal Application No  
PCT/EP 97/01197

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 B65D81/32 B65D75/58

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 271 976 A (REDMOND SANFORD) 22 June 1988	1,2,4-10
Y	see column 7, line 26 - column 11, line 14 see figures 3,4,7A-7C	11-18
Y	FR 2 439 725 A (SAKURA COLOR PROD CORP) 23 May 1980 see figures 1,7,14	11-18
X	EP 0 280 784 A (DISPEN PAK JAPAN CO INC) 7 September 1988 see column 1, line 51 - column 2, line 1 see column 2, line 55 - column 3, line 32 see figures 1A-1C	1-5

☒ Further documents are listed in the continuation of box C.

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Date of the actual completion of the international search

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 074 540 A (BEICH, F.R. ET AL) 22 January 1963 see column 4, line 47 - line 52 see figures 7,8	12
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